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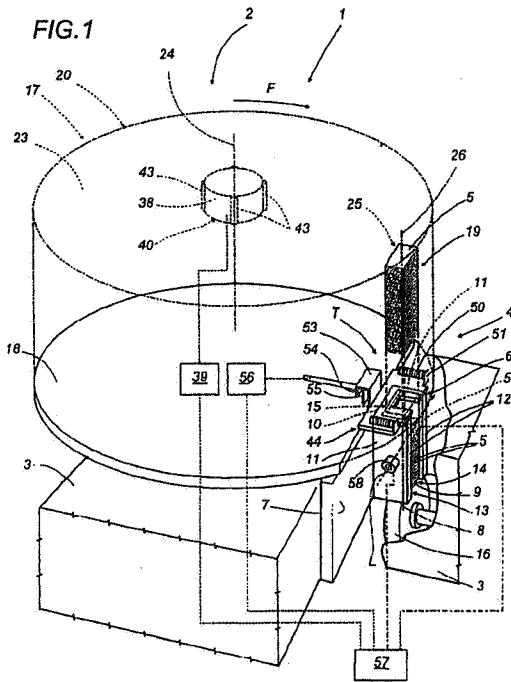
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(54) A unit for feeding labels to a user machine

(57) A unit for feeding labels (5) to a user machine (2) incorporates at least one stationary main magazine, or hopper (6), holding a stack (9) of labels (5) that are taken up singly and transferred to the work stations of the machine (2), and at least one auxiliary magazine (17) furnished with a plurality of compartments (25) each

containing a stack (19) of the labels (5); the auxiliary magazine (17) is embodied as an interchangeable cartridge mounted removably to a support structure (18) and driven in such a way as to position each compartment (25) in succession at a station (T) where the labels (5) are transferred from the single compartment (25) to the hopper (6).

FIG. 1



notes a portion, in its entirety, of a packer machine 2 (not illustrated) for manufacturing packets of cigarettes.

[0014] The portion 1 of the machine comprises a bed 3 carrying a feed unit 4 for labels 5 of rectangular shape, each affixable in conventional manner (not illustrated) to a respective packet of cigarettes (not illustrated) and functioning as a seal or revenue stamp.

[0015] The unit 4 comprises a stationary main column feed magazine, or hopper 6, which is associated with the bed 3 by way of a vertically disposed flat mounting plate 7, aligned on a predominating vertical axis 8 and designed to hold a stack 9 of labels 5 aligned likewise on the selfsame axis 8.

[0016] The hopper 6 presents a flat back wall 10 disposed parallel to the axis 8 and secured parallel to the plate 7, two flat side walls 11 extending at right angles to the back wall 10 and parallel likewise to the axis 8, also two flat front walls 12 extending at right angles from the respective side walls 11 one toward the other, parallel to the back wall 10, and compassing a longitudinal opening 13 through which the inside of the hopper 6 is accessible. These same walls 10, 11 and 12 combine to create an outlet 14 at the bottom end and an inlet 15 at the top end, by way of which the labels 5 are admitted and released respectively.

[0017] The outlet 14 is positioned directly above a pickup head 16 equipped with conventional vacuum sectors (not illustrated), by which the labels 5 are taken up singly from the outlet 14 and transferred singly and in succession, in a conventional manner not illustrated, to the work stations (not illustrated) of the packer 2, whilst the inlet 15 is positioned directly below an auxiliary magazine 17 from which the hopper 6 is filled.

[0018] The auxiliary magazine 17, which is illustrated schematically in fig 1 with phantom lines, affords a relatively large storage capacity in comparison to the hopper 6 and is embodied, considered in its entirety, as an interchangeable cartridge of the feed unit 4.

[0019] The magazine 17 is supported on the bed 3 by way of a horizontally disposed flat plate 18 extending at right angles away from the vertical plate 7 on the side opposite to the hopper 6. In particular, the magazine 17 is detachable from the plate 18, and power driven in such a way as will allow previously formed stacks 19 of labels 5 to be fed into the hopper 6 automatically along the direction of the relative axis 8 at a transfer station T coinciding with the inlet 15.

[0020] As discernible to advantage in figs 2, 4, 5 and 6, the magazine 17 comprises a drum-like frame 20 of hollow embodiment, constructed from a material of low specific weight. The frame 20 appears thus as a bell housing delimited externally and internally by respective substantially cylindrical walls 21 and 22, and by a lid 23 uppermost.

[0021] The external wall 21 extends around an axis 24 substantially of symmetry on which the frame 20 is centred, and presents a plurality of longitudinal compartments 25 with respective central axes 26 disposed par-

allel to the axis 24 of the frame and equispaced along a looped circular path P centred on the selfsame axis 24.

[0022] Each compartment 25 serves to hold a respective previously formed stack 19 of labels 5 aligned on the corresponding axis 26, and exhibits a structure similar in all respects to that of the hopper 6. More particularly, each compartment 25 presents a flat back wall 27 disposed parallel to the axis 26, two flat side walls 28 extending at right angles to the back wall 27 and parallel to the axis 26, also two flat front walls 29 extending at right angles from the respective side walls 28 one toward the other, parallel to the back wall 27, and compassing a longitudinal opening 30 through which the inside of the compartment 25 is accessible.

[0023] In like manner to the hopper 6, the walls 27, 28 and 29 of each compartment 25 combine to create an outlet 31 at the bottom end and an inlet 32 at the top end, by way of which the labels 5 are admitted and released respectively.

[0024] The internal wall 22 extends likewise symmetrically about the axis 24 of the frame 20 and combines with the external wall 21 to establish a plurality of longitudinal parallelepiped cavities 33 presenting a substantially trapezoidal section, each located between two successive compartments 25. The single cavity 33 presents a back wall 34, two flat side walls 35 coinciding in part with the side walls 28 of the adjacent compartments 25, and a flat front wall 36 interconnecting the front walls 29 of the adjacent compartments, all of which are disposed parallel to the axis 24. Also forming part of each cavity 33 is a bottom wall 37 disposed orthogonally to the axis 24.

[0025] The magazine 17 is supported by the plate 18 with the bottom walls 37 of the cavities 33 resting on the plate 18 and the centre axis 24 parallel to the axis 8 of the hopper 6, and is power driven by the shaft 38 (fig 1) of a stepping actuator 39 such as will cause the frame 20 to rotate intermittently about the axis 24 in the direction of the arrow F. To this end, the lid 23 of the frame 20 affords a central hole 40 by way of which the entire assembly is coupled coaxially to the shaft 38.

[0026] The hole 40 is delimited by a peripheral surface 41 presenting a plurality of grooves 42 designed to couple with respective longitudinal ribs 43 on the shaft 38 in such a manner as will determine a given angular position of the frame 20, relative to the shaft 38, in which the compartment 25 occupying the transfer station T is disposed with its axis 26 aligned on the axis 8 of the hopper 6. In this same position of alignment, the walls

27, 28 and 29 of the compartment 25 are substantially aligned with the respective walls 10, 11 and 12 of the hopper 6, and the outlet 31 of the compartment 25 is adjacent to and centred above the inlet 15 of the hopper 6. In short, the grooves 42 and the ribs 43 constitute reference means by which the magazine 17 can be made to assume a predetermined position relative to the plate 18.

[0027] The shaft 38 is indexable through a step equal

to the angular distance at which the compartments 25 are spaced apart around the axis 24 in such a way that, during operation, the single compartments 25 will come to rest one after another in alignment with the transfer station T.

[0028] The outlet 31 of each compartment 25 is equipped with a relative shutter device 44 that comprises a retractable barrier element 45 capable of movement between a retracted position in which the outlet 31 is open (fig 6), and an extended position in which the outlet 31 remains closed (figs 3, 4 and 5). The "retracted" and "extended" positions are understood as coinciding with a given radial generator of the frame 20 and related to the axis 24.

[0029] Each barrier element 45 consists in a flat plate 46 disposed orthogonally to the walls 27, 28 and 29 of the compartment 25. The plate 46 includes a central portion 47 defining a retractable bottom wall 48 of the compartment 25, and two lateral appendages 49 supported slidably from beneath by the respective bottom walls 37 of the adjoining cavities 33.

[0030] The shutter device 44 further comprises springs 50 located one above each lateral appendage 49. Each spring 50 is interposed between the back wall 34 of the cavity 33 and a lug 51 extending upward from the respective appendage 49 at right angles.

[0031] The springs 50, the appendages 49, the lugs 51 and the back walls 34 of the cavities 33 combine to establish a tension device 52 such as will hold the respective barrier element 45 elastically in the aforementioned extended closed position, whilst the back walls 34, side walls 35 and bottom walls 37 of the cavities 33 and the appendages 49, on the one hand, and the side walls 35 of the cavities 33 and the lugs 51 on the other, operate in conjunction with one another to allow the plate 46 a single radial movement between the retracted open position and the extended closed position.

[0032] The central portion 47 of each plate 46 is attached on the side remote from the lugs 51 to a block 53 affording a channel 54 disposed tangentially to the frame 20. In operation, each block 53 in succession couples by way of the relative channel 54 with a slide 55 supported by the plate 18 and occupying the transfer station T.

[0033] The slide 55 is operated, moving radially between a retracted position and an extended position, by an actuator 56 which together with the aforementioned stepping actuator 39 is connected to a respective output of a controller 57 (fig 1).

[0034] The controller 57 is also connected on the input side to a barrier photocell 58 of which the beam line L is set at an appropriate height between the two side walls 11 of the hopper 6.

[0035] The operation of the unit 4 will now be described starting from a situation in which the magazine 17 has been indexed through one angular step (fig 4) and a compartment 25 brought thus into the transfer station T with its axis 26 aligned on the axis 8 of the hopper

6 (fig 5). During this same step, the slide 55 will be occupying the extended position and the plate 46 of the compartment 25 maintained in the relative extended closed position through the agency of the tension device 52.

[0036] On entering the transfer station T, the channel 54 afforded by the block 53 fixed to the plate 46 is engaged by the slide 55, whereupon the actuator 56 will be piloted by the controller 57 to draw the slide 55 into the retracted position (fig 6).

[0037] Following the retraction of the plate 46 brought about by the movement of the slide 55 against the action of the springs 50, the stack 19 of labels 5 contained in the compartment 25 can drop freely and unite with the 15 depleting stack 9 of labels 5 in the hopper 6 to form a single stack.

[0038] Importantly, the movement of the plate 46 from the extended closed position toward the retracted open position will occur in a relatively short space of time, in 20 order to avoid a disorderly descent of the labels 5 into the hopper 6.

[0039] As the labels 5 are taken up singly by the pick-up head 16 from the outlet 14 of the hopper 6, the height of the stack in the hopper 6 falls gradually and dips below the beam line L of the photocell 58. Recognizing the condition, the controller 57 causes the slide 55 to return to the normally extended position and indexes the magazine 17.

[0040] The operating steps of the unit 4 described thus far will now be repeated cyclically until the full supply of labels 5 in the magazine 17 has been depleted.

[0041] Once empty, the magazine 17 can be lifted manually by an operator and separated from the shaft 38 and the slide 55, then replaced with a full magazine 35 17 loaded previously in a location remote from the packer 2.

[0042] It will be observed that the operation of replacing the magazine 17 can be accomplished quickly, given the lightweight structure of the hollow frame 20 and the 40 simple type of coupling with the shaft 38. The operation is performed during the interval of time between the moment immediately following the return of the slide 55 to the extended position and the moment when the stack in the hopper 6 is fully depleted, the operator having first inhibited the stepping actuator 39. Once the new magazine 17 is in place, the sequence resumes with the retraction of the slide 55, and therefore of the plate 46. The schematic diagram of fig 7 shows an alternative embodiment of the feed unit 4 described thus far, denoted 45 59 in its entirety.

[0043] In this feed unit 59, the plate 18 is replaced by a turntable or carousel 60 rotatable about an axis 61 parallel to the axis 8 of the hopper 6 and designed to carry two removable auxiliary magazines 17 of the type described above with axes 24 occupying positions diametrically opposed in relation to the main axis 61.

[0044] The carousel 60 is rotated through steps of 180° about the axis 61, driven by an actuator 62 that

can be controlled by an operator in such a way as to position the two magazines 17 alternately in alignment with an operating station R at which the hopper 6 is filled, and a non operating station C at which empty and full magazines are changed over. The magazine 17 that occupies the filling station R is positioned relative to the hopper 6 and operated in the same way as the unit 4 described previously, whilst the magazine 17 occupying the changeover station C can be replaced manually by an operator at leisure as the magazine at the filling station R is emptied.

[0045] The operation of the unit 59 is readily discernible from the foregoing description and therefore needs no further explanation. It may usefully be noted, nonetheless, that the carousel 60 described above might also carry more than two removable auxiliary magazines positioned symmetrically in relation to the main axis 61.

[0046] The example of fig 8 illustrates a feed unit 63 of different embodiment associated with the packer 2. The unit 63 differs only in part from the unit 4 described previously, and more exactly in that the auxiliary magazine 17 is replaced by a magazine 64 in its entirety. Accordingly, those parts of the unit 63 mentioned already in the description of the first unit 4 will be referred to for the sake of convenience using the same numbers.

[0047] As in the case of the first magazine 17 described, the magazine 64 shown in fig 8 affords a relatively large storage capacity in comparison to the hopper 6 and is embodied, considered in its entirety, as an interchangeable cartridge of the feed unit 63. The magazine 64 comprises a frame 65 of essentially parallelepiped shape constructed from a material of low specific weight. The frame 65 in question is substantially a linear development of the frame 20 described above, presenting a bottom wall 66 and a top wall 67 extending parallel one with another, a back wall 68 and a front wall 69 extending parallel one with another and at right angles to the bottom wall 66 and the top wall 67, and two side walls (not illustrated) orthogonal to the remaining four walls 66, 67, 68 and 69.

[0048] The front wall 69 of the frame presents a plurality of longitudinal compartments 25 each serving to hold a respective stack 19 of labels 5 and similar in every respect to those of the frame 20 described previously. In the description that follows, parts of the magazine 64 already mentioned in describing the magazine 17 above are referred to for the sake of convenience using the same numbers.

[0049] The compartments 25 have respective central axes 26 disposed parallel one with another, and are ranged uniformly along a rectilinear path P' extending perpendicular to the selfsame axes 26.

[0050] The back wall 68 and the front wall 69 combine to create longitudinal parallelepiped cavities 33 of substantially rectangular cross section disposed one between each two adjoining compartments 25. Likewise in this embodiment, the function of the cavities 33 is to re-

duce the weight of the frame 65 and, in the same manner as already described, to accommodate the appendages 49 of the retractable barrier elements 45 and the relative springs 50 of the shutter devices 44 by which the outlets 31 of the compartments 25 are opened and closed.

[0051] The bottom wall 66 of the linear frame 65 presents a longitudinal groove 70 extending parallel to the back and front walls 68 and 69, coupled slidably with a rib 71 afforded by a bar 72 which is mounted to the bed 3 and serves to support and guide the magazine 64. More exactly, the bar 72 is positioned on the bed 3 in such a manner that the axes 26 of the compartments 25 lie parallel with and in the same plane as the axis 8 of the hopper 6. The fit between the groove 70 and the rib 71 is such that the magazine 64 can be lifted from the bar 72.

[0052] The magazine 64 is power driven reversibly by a relative drive 73 such as will advance the magazine 64 step by step along the rib 71, through the transfer station T, in the direction of the arrow F' or in the opposite direction.

[0053] The drive 73 comprises an actuator 74 from which motion is transmitted to a pinion 75 rotatable about an axis 76 parallel to the axes 26 of the compartments 25, also a rack 77 in mesh with the pinion 75 and associated with the frame 65, in such a way that the magazine 64 is made to translate intermittently in the direction of the arrow F' or the direction opposite. The rack 77 is associated with the back wall 68 and presents a groove 78 on the side farthest from the pinion 75, coupled with a rib 79 projecting from the wall 68 and disposed parallel with the axes 26 of the compartments 25. The position of the frame 65 along the bar 72 is determined by the position of the rack 77, and such that the compartment 25 which occupies the transfer station T will be disposed with its axis 26 aligned on the axis 8 of the hopper 6. Thus, the groove 78 and the rib 79 provide reference means by which the magazine 64 can be made to assume a predetermined position relative to the bar 72.

[0054] In addition, the rack 77 translates through a step equal to the distance at which the compartments 25 are spaced apart along the path P', so that during operation, the successive compartments 25 will come to rest in alignment with the transfer station T. The stepping actuator 74 and the actuator 56 of the slide 55 are connected to the controller 57, which again is connected to the photocell 58 and operates according to the same logic as mentioned above with reference to the unit 4 first described.

[0055] It will be clear enough from the foregoing that the operation of the unit 63 is similar in all respects to that of the unit 4 first described and therefore needs no further explanation.

[0056] Likewise in this example, the empty magazine 64 can be replaced manually by an operator in the manner already described. In particular, the replacement operation involves simply lifting the magazine 64 from the

rib 71, the groove 78 and the slide 55, then fitting a full magazine 64 loaded previously in a location remote from the packer 2. Whenever the magazine 64 is replaced, needless to say, the direction of movement transmitted to the rack 77 will be reversed.

[0057] It will be appreciated that, whilst the various examples described are illustrated with just one hopper, the spirit of the present invention will nonetheless embrace any given solution whereby the auxiliary magazine is used to supply two or more hoppers, perhaps holding respective stacks 19 of dissimilar labels.

Claims

1. A unit for feeding labels to a user machine, comprising at least one stationary main magazine or hopper (6) containing a stack (9) of labels (5), from which the labels (5) are taken up singly and transferred to the work stations of the user machine (2); at least one auxiliary magazine (17; 17; 64) furnished with a plurality of compartments (25) each serving to contain a respective stack (19) of labels (5); and first drive means (38; 38; 73) by which the auxiliary magazine (17; 17; 64) can be set in motion in such a way as to position each compartment (25) in succession at a station (T) where the labels (5) are transferred from the single compartment (25) to the main magazine (6), characterized in that the auxiliary magazine (17; 17; 64) of the unit (4; 59; 63) is embodied as an interchangeable cartridge.
2. A unit as in claim 1, comprising support means (18; 60; 72) to which the auxiliary magazine (17; 17; 64) is mounted in removable fashion.
3. A unit as in claim 1 or claim 2, wherein each compartment (25) of the auxiliary magazine (17; 17; 64) is fashioned with an openable outlet end (31) by way of which the respective labels (5) can be transferred to the main magazine (6), and equipped with a relative shutter device (44) by which the outlet end (31) can be opened and closed.
4. A unit as in claim 3, wherein the shutter device (44) comprises a barrier element (45) capable of movement between positions in which the outlet end (31) is opened and closed, respectively.
5. A unit as in claim 4, wherein the shutter device (44) comprises tension means (52) by which the barrier element (45) is maintained normally in the closed position.
6. A unit as in claim 5, wherein tension means (52) comprise elastic means (50).
7. A unit as in claim 6, wherein elastic means (50) comprise at least one spring (50).
8. A unit as in claims 3 to 7, comprising actuator means (55) positioned at the transfer station (T) and interacting with the shutter devices (44) in such a way as to open and/or close the respective outlet ends (31).
9. A unit as in claims 1 to 8, wherein the auxiliary magazine (17) comprises a frame (20) on which the compartments (25) are distributed uniformly around a looped path (P).
10. A unit as in claim 9, wherein the looped path (P) is a circular path.
11. A unit as in claim 10, wherein the frame (20) is rotatable about a first axis (24) through the agency of the first drive means (38), and the compartments (25) are aligned on relative stacking axes (26) disposed parallel to the first axis (24) and distributed uniformly about the selfsame first axis (24).
12. A unit as in claim 11, wherein the frame (20) appears as a hollow drum delimited externally by a substantially cylindrical periphery (21) around which the compartments (25) are distributed uniformly.
13. A unit as in claims 2 to 12, comprising at least two auxiliary magazines (17) mounted removably to the support means (60), wherein the unit (59) is equipped with second drive means (62) operated in such a way as to position each auxiliary magazine (17) in succession at a station (R) where the main magazine (6) is filled.
14. A unit as in claim 13, wherein support means (60) consist in a carousel (60) rotatable about a second axis (61) and proportioned to carry at least two auxiliary magazines (17) mounted removably and distributed uniformly about the second axis (61).
15. A unit as in claims 1 to 8, wherein the auxiliary magazine (64) comprises a frame (65) on which the compartments (25) are distributed uniformly along a rectilinear path (P').
16. A unit as in claims 2 to 15, comprising reference means (42, 43; 42, 43; 78, 79) by which the auxiliary magazine (17; 17; 64) is made to assume a predetermined position relative to the support means (18; 60; 72).

FIG. 1

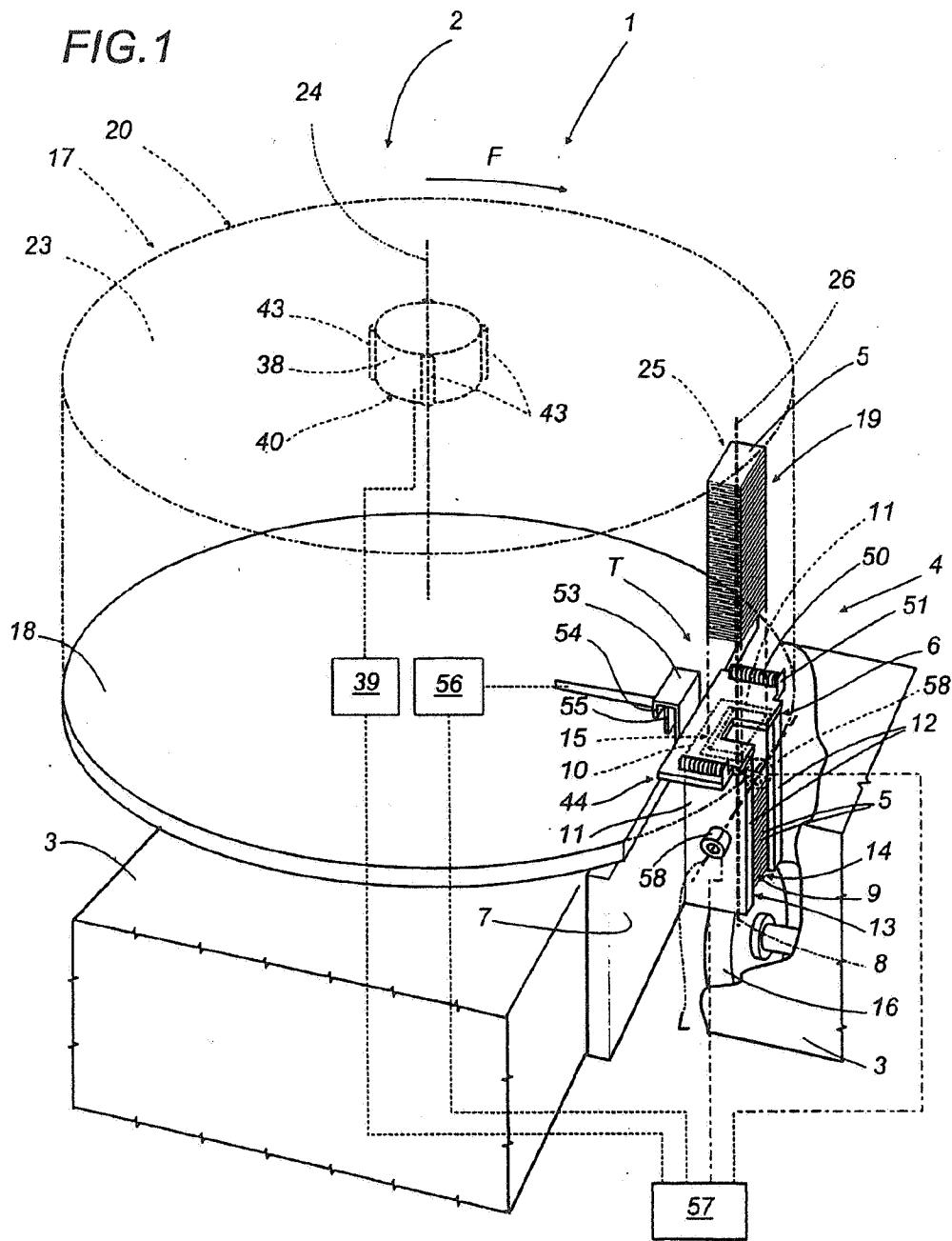


FIG. 2

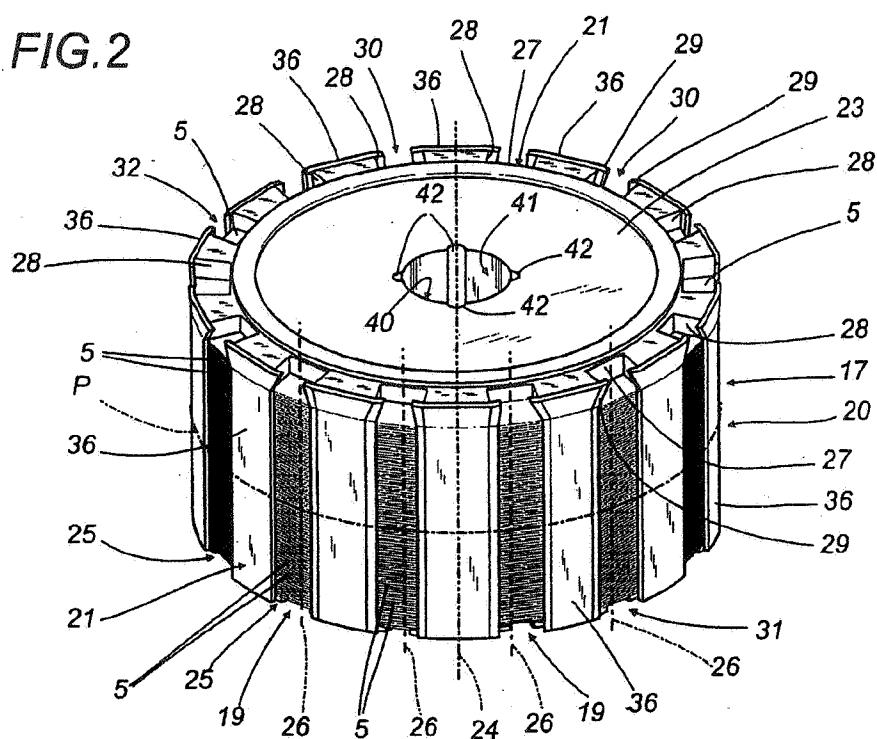


FIG. 3

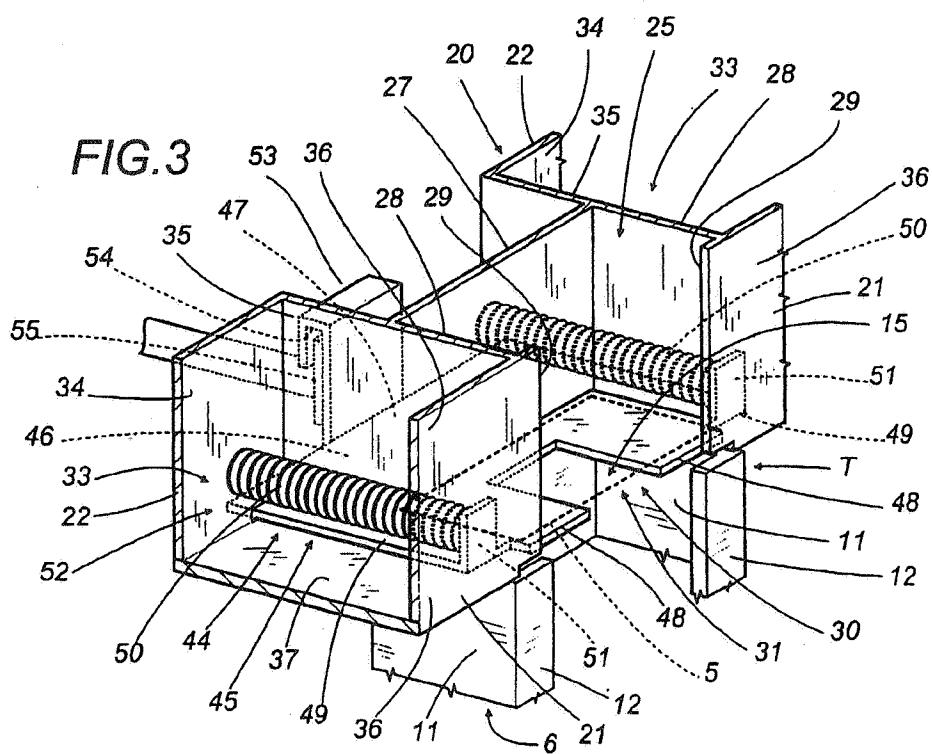


FIG.4

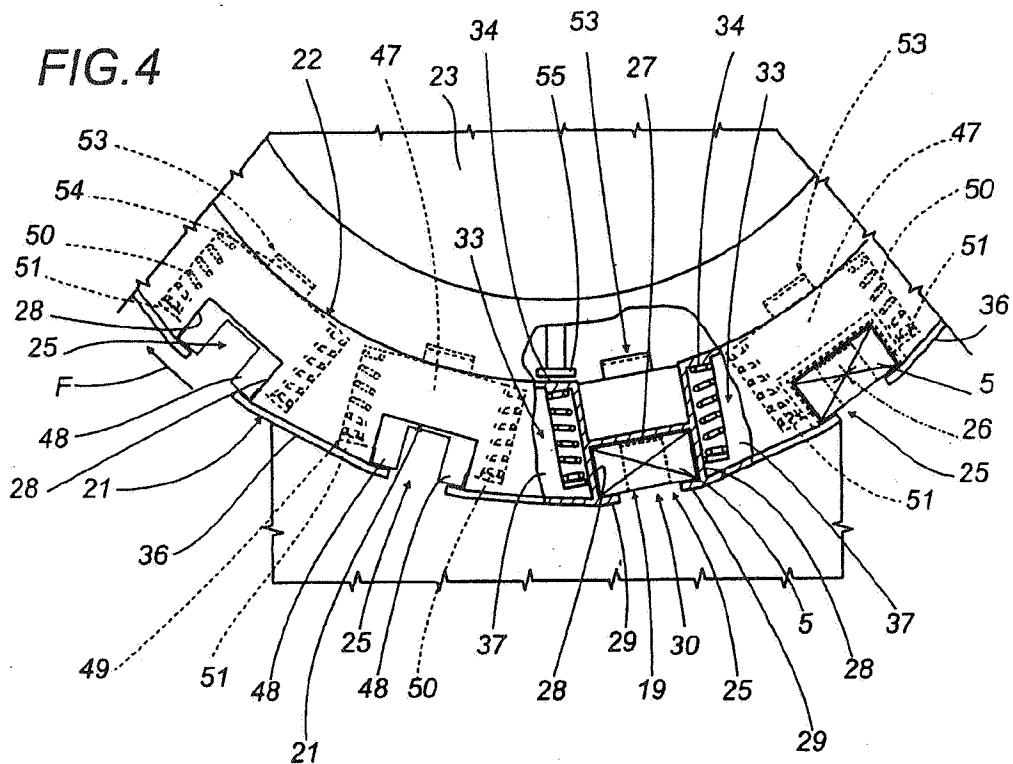


FIG.5

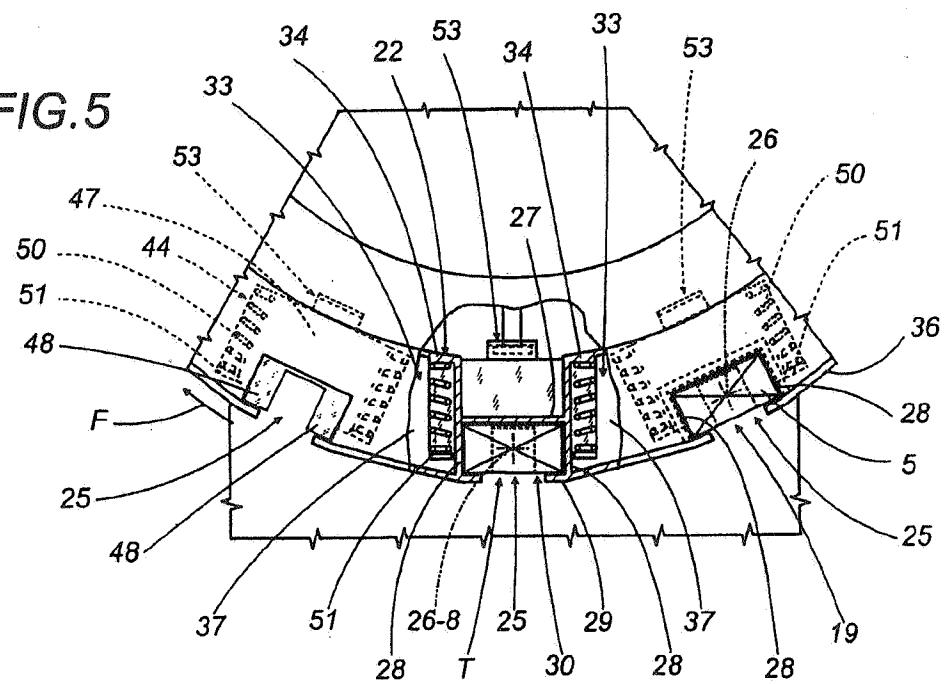


FIG.6

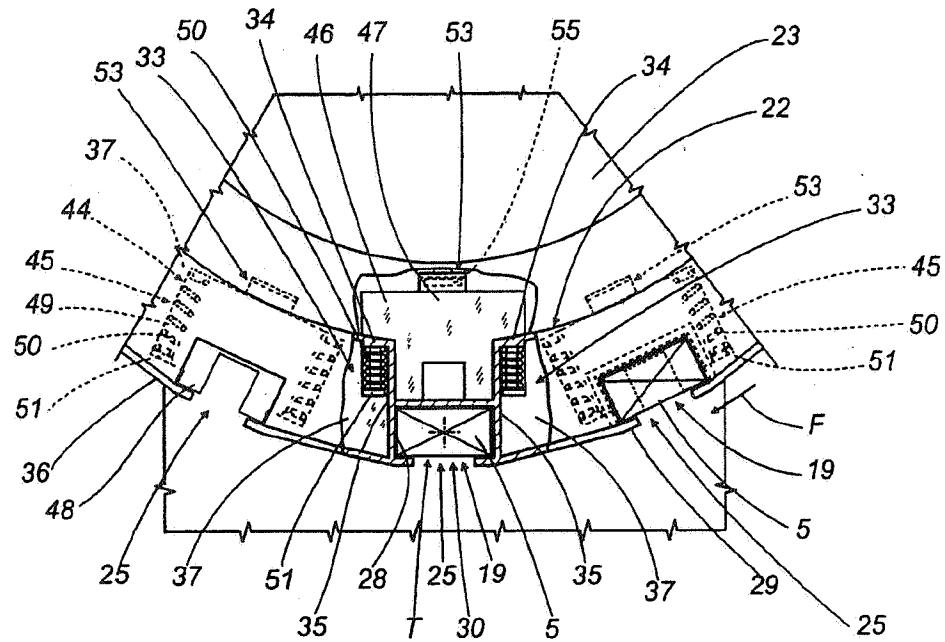


FIG.7

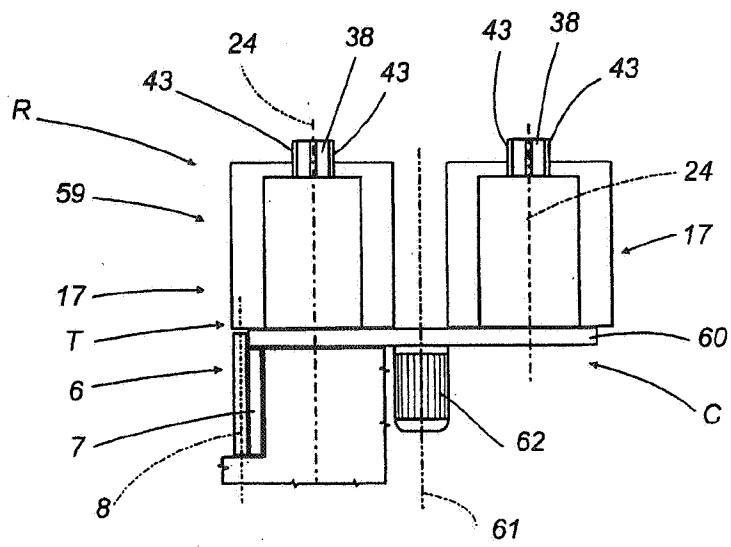
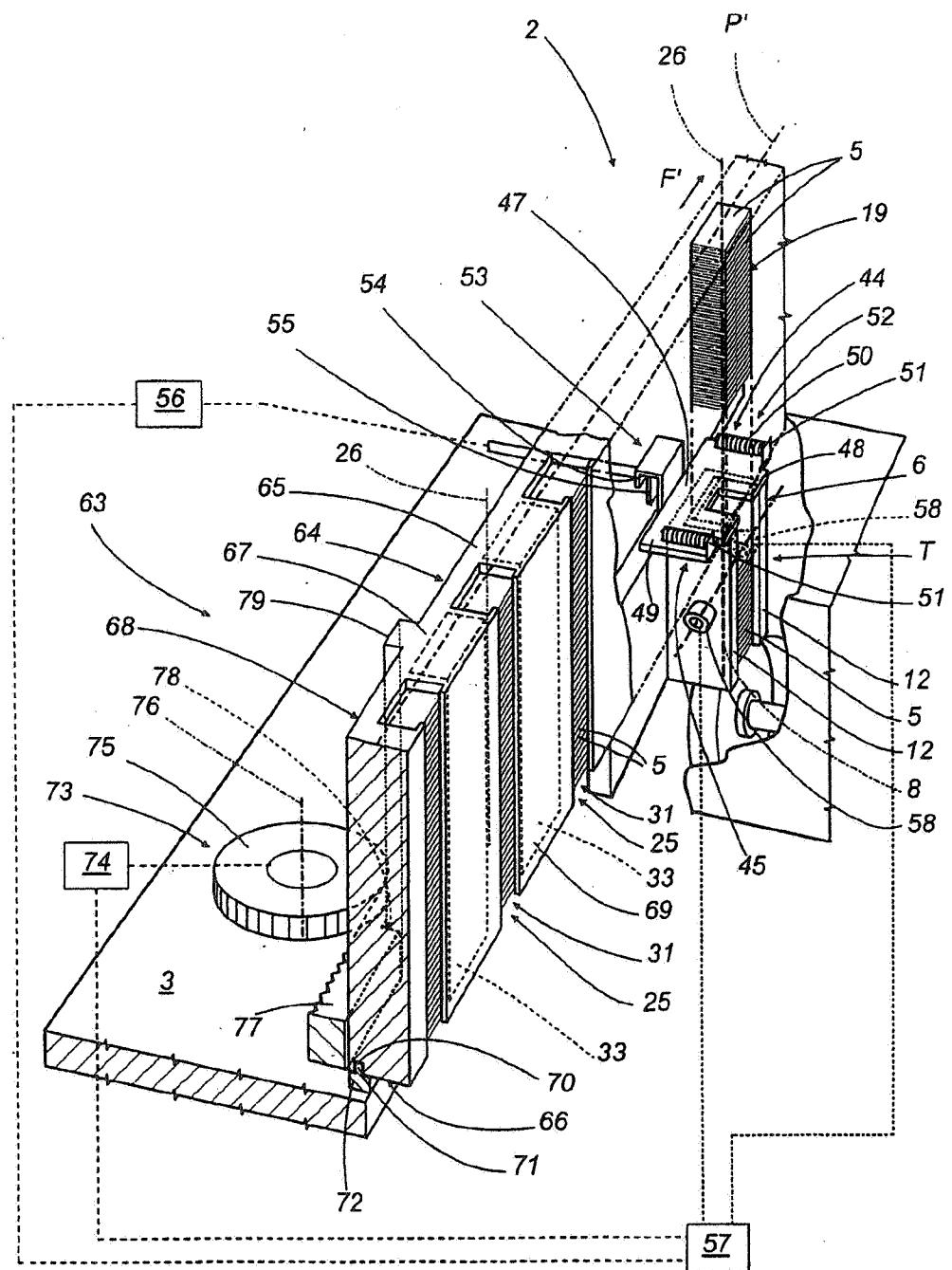


FIG.8





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EUROPEAN SEARCH REPORT

Application Number
EP 00 83 0698

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int.Cl.)						
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim							
X	DE 197 30 307 A (FOCKE & CO) 21 January 1999 (1999-01-21) * column 3, line 59 - column 4, line 37; figures *	1-4,8, 13,15,16	B65C9/10						
D,A	US 3 929 326 A (SERAGNOLI) 30 December 1975 (1975-12-30) * claim 1; figures *	1							
A	WO 96 15034 A (SMYTH SYSTEMS COMPANY) 23 May 1996 (1996-05-23)								
A	US 5 395 208 A (MOJDEN ET AL.) 7 March 1995 (1995-03-07)								
A	DD 286 546 A (SCHÄFER) 31 January 1991 (1991-01-31)								
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)						
			B65C B65B B65H						
<p>The present search report has been drawn up for all claims</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="text-align: left;">Place of search</th> <th style="text-align: left;">Date of completion of the search</th> <th style="text-align: left;">Examiner</th> </tr> <tr> <td style="text-align: center;">THE HAGUE</td> <td style="text-align: center;">25 January 2001</td> <td style="text-align: center;">Deutsch, J.-P.</td> </tr> </table>				Place of search	Date of completion of the search	Examiner	THE HAGUE	25 January 2001	Deutsch, J.-P.
Place of search	Date of completion of the search	Examiner							
THE HAGUE	25 January 2001	Deutsch, J.-P.							
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EP 00 83 0698

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 The members are as contained in the European Patent Office EDP file on
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25-01-2001

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
DE 19730307	A	21-01-1999	WO	9903736 A		28-01-1999
US 3929326	A	30-12-1975	IT	992087 B		10-09-1975
			AR	203845 A		31-10-1975
			AT	344099 B		10-07-1978
			AT	442974 A		15-10-1977
			BR	7405609 A		09-09-1975
			CA	1002486 A		28-12-1976
			CH	568912 A		14-11-1975
			CS	178818 B		31-10-1977
			DD	112951 A		12-05-1975
			DE	2423883 A		30-01-1975
			ES	426933 A		16-07-1976
			FR	2236764 A		07-02-1975
			GB	1465619 A		23-02-1977
			IN	141851 A		23-04-1977
			JP	1238218 C		31-10-1984
			JP	50039900 A		12-04-1975
			JP	59011495 B		15-03-1984
			NL	7408270 A		14-01-1975
			SE	423374 B		03-05-1982
			SE	7408603 A		13-01-1975
			SU	843725 A		30-06-1981
WO 9615034	A	23-05-1996		NONE		
US 5395208	A	07-03-1995	AU	671775 B		05-09-1996
			AU	7589294 A		08-06-1995
			CA	2134036 A		30-05-1995
			DE	69404426 D		28-08-1997
			DE	69404426 T		04-12-1997
			EP	0655404 A		31-05-1995
			JP	7223710 A		22-08-1995
DD 286546	A	31-01-1991		NONE		